Research and Surveillance in Emergency Response and Recovery Workers: Opportunities and Challenges

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The findings and conclusions in this report are those of the author(s) and do not necessarily represent the views of the National Institute for Occupational Safety and Health.
How Does NIOSH Respond to outbreaks and emergencies?
Emergency Preparedness and Response Office

Mission: To protect the health and safety of emergency response providers and recovery workers

• Created in response to 9/11
• Emergency planning and response coordination for NIOSH
• Provide technical assistance during incidents (onsite or remote)
• Coordinate NIOSH field deployments
• Staff the Worker Safety and Health Team in the CDC Emergency Operations Center when activated
• Coordinate with the OSHA through the National Response Framework Worker Safety and Health Annex

• Promote research to protect responders *
What is Disaster Science Research?

• Health Studies During a Disaster
  ➢ Non-research activities
  ➢ Public health investigations
  ➢ Pilot investigations
  ➢ Responder health research
Process for Determining When to Conduct Research

Baseline Activities
- Exposure Assessment
- Health Surveillance
- Health Monitoring
- Rostering/Registry

Public Health Investigations
- Cross-sectional studies
- Cluster investigations
- Case reviews
- Exposure assessment
- Site-specific investigations

Factors to Consider When Proposing Research
- Exposure-related (unique, novel, unusual)
- Adverse event-related (frequency, uniqueness, unforeseen)
- Public health significance and scientific importance
- Societal factors
- Feasibility factors (ability to document individual exposures, availability of control population, etc.)
- Pre-identified research areas (academic interest)

Pilot Investigation

Scientific Query, Hypothesis Generation

Controlling Gatekeeper Factors

Factors Not Met
Do Not Proceed: Research Not Justified

Factors Are Met
Conduct Pilot Investigation
Proceed with Responder Research Study

Emergency Response and Recovery Worker Research

Examples

• Ebola
• Deep Water Horizon
• Anthrax
• SARS Outbreak
• Hurricane Sandy
• Hurricane Katrina
• World Trade Center
Definitions

• **Responder**: Response and recovery workers, traditional first responders, contractors, volunteer organizations, healthcare workers, public health personnel, construction and utility workers

• **Disaster Types**: All hazards, intentional & naturally occurring, small & large-scale incidents, all phases of a response

An Inventory of EPA’s Tools for Enhancing Community Resilience to Disasters (2016)
DSRR Program: Internal Steering Committee

• Began March 2015
• Identified priority research topics in FY16
• Participating on federal interagency working groups
  • HHS/ASPR Science Preparedness Research Interagency Team
  • HHS/ASPR Recovery Coordination Committee
• Meeting with stakeholders and partners

https://www.cdc.gov/niosh/topics/disasterscience/default.html
DSRR Program Strategic Goals

• # 1: Identify critical topic areas for responder research
• # 2: Address major challenges associated with conducting research during disasters
• #3: Identify data collection capabilities and information resources to be utilized for research purposes
• #4: Ensure research findings and lessons learned are translated into practice
Research Activities

(Beginning FY17)
Risk Assessment Tool for PPE Selection During Infectious Disease Outbreaks

• **Problem:**
  - Novel hazards present challenges to recommend, select, procure, and prioritize use of PPE
  - Demand for PPE in the US is often larger than the available supply

• **Solution:**
  - Use “control banding” to guide selection using available data, observations, and assumptions based on past experience and decision logic.

• **Output:**
  - Develop mobile app tools to assist in the selection and prioritization of control options covering a wide range of exposures, and jobs or tasks.

Funding Source: CDC/OPHPR Ebola Supplemental Funding via rapid BAA pilot study
Modeling Radiation Exposure of First Receivers in Shelters and Hospitals from Contaminated Evacuees

• **Problem:**
  • Evacuees exposed to dangerous levels of external ionizing radiation pose a health hazard to first receivers

• **Solution:**
  • In the absence of monitoring data during early hours of response, model potential radiation exposure to first receivers and volunteers performing triage in public shelters after a nuclear detonation.

• **Output:**
  • A manuscript will be submitted for publication by the end of this FY
Development of Exposure Assessment Plans for the First 72 hours Following a Disaster

• **Problem:**
  • Exposures during first 72 hours often most intense, unique, and most poorly characterized
  • Exposure monitoring during this period presents many challenges, given immediate emphasis on critical response activities

• **Solution:**
  • Provide responders the tools needed to assess worker exposures from start of response to identify immediate remedial actions

• **Output:**
  • Model exposure assessment plans to be piloted in actual disasters to improve responder safety and health

In collaboration with NIOSH Division of Applied Research and Technology and NCEH
Potential for Aerosol Transmission During the Care of Cats Infected with H7N2

• In 2016, H7N2 identified as source of an outbreak among cats in animal shelters in NYC
• One shelter employee became infected
• All cats in NYC’s shelter system put in temporary quarantine facility
• Involved over 300 emergency response ASPCA volunteers, from 33 different states
• Air and surface samples collected throughout the facility for viable and nonviable agent
HHS Ignite Award: Rapid Fit-Testing Methods for N95s During a Disaster Response

- Consisted of a 3-month program; assigned innovation mentors
- Long-standing problem related to fit-testing during responses leading to use of respirators without fit-testing
- Goal is to address challenging policies and procedures to identify practical, rapid methods for field use
- Identify best evidence-based solutions for implementation

Collaboration with HHS and NPPTL
DSRR Rapid and Robust IRB Review

• Developing a generic protocol for *provisional* IRB approval
• Study design templates (e.g., biomonitoring, exposure assessment, lab/chamber studies)
• Amendment submitted with actual research study specifics
• IRB processes
  • Research/non-research determination
  • Accelerated review
Emergency Responder Health Monitoring and Surveillance™ (ERHMS™)

• Released ERHMS Info Manager™ 2.0
• During FY17, provided ERHMS™ training to over 300 professionals including academics; federal, state, and local public health staff; and industrial hygienists
• Provided two trainings on ERHMS™ during the hurricane response in Houston: Univ TX Houston ERC and the TX DSHS for state, regional, and local health departments and other preparedness staff (92 participants)
• Working with FEMA’s Centers for Domestic Preparedness (Anniston) to develop a disaster epi course that would include ERHMS™
Occupational Health and Safety Surveillance During Disaster Responses

- Variety of data sources for occupational injury and illness data
  - Census of Fatal Occupational Injuries
  - Death certificates
  - Hospital Emergency Department system
  - Hospital Discharge system
  - Workers’ Compensation
  - Survey of Occupational Injuries and Illness
Occupational Health and Safety Surveillance During Disaster Responses

• Issues with these systems:
  • Not timely (lag time of months to years)
  • More for acute injury outcomes
  • Cannot easily identify disasters or identify responders in these systems
Occupational Health and Safety Surveillance During Disaster Responses

• Currently, limited approaches to collect “real time” or “near real time” work-related injuries, illnesses, or exposures to responders

• Are certain broad public health surveillance approaches, but “work” not part of them

• Limits ability to track and react to concerns for responders during a disaster
Occupational Health and Safety Surveillance During Disaster Responses

• Current options to assess/improve:
  • Emergency Responder Health Monitoring and Surveillance™ (ERHMS™) framework
    • Key component includes surveillance and monitoring for exposures and adverse health effects
  • Syndromic Surveillance Systems
ERHMS Info Manager™

- Platform used to implement ERHMS™
- Includes tools needed to develop custom forms and reports
- Includes pre build forms for rostering of responders and tracking of work assigned
- Future enhancements to include pre build forms and reports on:
  - Injury module
  - Illness module
  - Exposure module
  - Mental health module

http://www.cdc.gov/niosh/topics/erhms/
Syndromic Surveillance System

- Permits “near real time” surveillance
- Not available in all locations, but expanding
- “Work” determined by narrative searches
- Can address injury, illness, and certain exposure issues
- Future work—improve narrative search approaches to identify cases (e.g., machine learning technologies)
Additional Thoughts?

• State interest in exploring:
  • ERHMS™?
  • Syndromic Surveillance options?
• Additional resources/contractors for data collection and analysis?
• Other options or opportunities for collaboration?
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DSRR Homepage  
https://www.cdc.gov/niosh/topics/disasterscience/default.html